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Graduate School of Engineering & Applied Sciences Newsletter / September 2006

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Message from the Dean

GSEAS continues to contribute to the enhancement of the combat effectiveness of the Navy and the security of our nation by providing relevant, high quality graduate education in engineering and applied sciences. The pace is both challenging and invigorating…the rewards are priceless. The core strengths of GSEAS can be captured with three simple words – people, quality, service. Our newsletters are intended to provide periodic snapshots of current examples of excellence, initiative and achievement within our great school. Our goal is to improve awareness and understanding of the enduring value of GSEAS to NPS, the Navy, DoD and our great nation. Your feedback and comments are always welcome.

NPS Day at SS/Loral

Professor Rudy Panholzer, Chair of the NPS Space Systems Academic Group, receives a special tribute - a framed photograph of a Galaxy 16 satellite - from former Space Systems Engineering student Brian Kosinski, Class of 1987.

The NPS Space Systems Department held its inaugural "NPS Day" at Space Systems/Loral in Palo Alto, CA, on April 10, 2006. Former Space Systems Engineering student Brian Kosinski, Class of '87, now directs product reliability for the global communications satellite company. The day-long intensive field trip featured back-to-back lectures and seminars by top Loral executives and lead scientists; an NPS brief by CDR Chris Adams, Associate Dean of the Graduate School of Engineering and Applied Sciences; and an information-packed tour of Loral's super clean Hi-Bays where towering satellites are assembled and tested. "I'm literally blessed to have had Professor Rudy Panholzer as my thesis advisor," Kosinski said. "He let some crazy students do a Space Shuttle experiment back in the 80's. I learned so much by doing that design and interfacing with NASA. That experience and guidance formed a basis for everything we're doing today."

Space Systems/Loral "NPS Day" participants on a tour of one of SS/L's super clean Hi-Bays. Front row from left to right: Dr. Marcello Romano, NPS Space Systems Academic Group; Mr. Ryan Zelnio, SS/L Manager, Spacecraft Testing and Analysis; and NPS NASA Professor James Newman. Back row from left to right: NPS Space Systems Engineering Ph.D. candidate LT Jason Hall, and NPS National Reconnaissance Office Chair and former astronaut CAPT Dan Bursch.

New Weather Radar

Jeffrey B. Knorr, Ph.D., Robert Bluth and Paul Buczynski of the NPS Department of Electrical and Computer Engineering (ECE) and the NPS CIRPAS Research Center recently fielded the first mobile, electronically scanned radar with a weather processing capability. The radar, currently undergoing testing and calibration, will serve as a testbed to explore the addition of weather now casting capability to tactical military radars. The electronic beam scan permits this radar to gather weather information more rapidly than a mechanically scanned radar. As a result, the radar is also a unique research instrument and will be used by radar meteorologists for scientific investigation of weather phenomena. The radar has been designated the MWR-05XP (Mobile Weather Radar, 2005, Xband Phased Array) analogous to the nation's WSR-88D NEXRAD weather radars. In recent years the NEXRAD radars have provided our nation's military forecasters with the ability to make predictions heretofore impossible and have advanced our scientific knowledge of weather related phenomena. The improved forecasts and warnings have been particularly beneficial for flight safety. This unique new radar system represents the culmination of an eight year team effort involving ECE Department Prof. Jeffrey B. Knorr, CIRPAS Director Bob Bluth, Radar Lab Staff Director Paul Buczynski and Ivan PopStefanija at Prosensing, Inc., Amherst MA. The project has been supported by the Office of Naval Research.

The MWR-05XP is the first mobile, electronically scanned radar with a weather processing capability. The X-band Phased Array electronic beam gathers weather data more rapidly than the mechanical version.

Free Electron Laser

NPS Directed Energy and Electric Weapons Center has been working with Stanford University to acquire a working Free Electron Laser (FEL) and combine it with our active FEL group in the Directed Energy and Electric Weapons Center. The Stanford FEL is a state-of-the-art machine using the latest superconducting accelerator cavity designs, and has an unparalleled record of contributing to science and will be moved from its location at Stanford in 2007, and has a replacement value of about $15 million. The Stanford FEL is a small-scale prototype of the kind of laser that is proposed for Navy's directed energy weapon system. A proposed site for the Stanford FEL has been located at the Navy's golf course about a quarter mile from the NPS campus and the site preparation of the existing building and the moving of the FEL are estimated to cost about $5 million. Professor Todd Smith, Stanford University co-developer of the Stanford FEL program, would like to see the FEL come to NPS and has expressed a desire to continue significant involvement with the FEL at NPS as Visiting Professor.

At NPS, the Stanford FEL would form a facility for continued research involving NPS students at both the masters and PhD level. Students would be involved in running the laser and carrying out the Navy's research on this important new weapon system for future electric ships. We would invite collaboration from National Laboratories such as Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory, Argonne National Laboratory, Brookhaven National Laboratory, and Jefferson Laboratory to participate in the Navy's research. The Stanford FEL is one of the world's most powerful sources of terahertz radiation, which is being studied for finding Improvised Explosive Devices (IEDs), and which is of particular importance to our partner institution LLNL, for research in Homeland security and military survivability.

In combination with the electromagnetic gun experimental facility at NPS, two major weapon systems proposed for the Navy's electric ships would be represented at NPS.

NPS Ice Cap Study

Buoy Phone Home

By Herald Staff Writer, KEVIN HOWE

Naval Postgraduate School scientist Timothy Stanton has a prominent place in a new book on global warming aimed at the young adult audience. The North Pole Was Here contains photographs, newspaper articles, drawings, capsule histories and author Andrew Revkin's firsthand account of his 2003 stay at Camp Borneo, the Russian-run scientific station at the North Pole, where scientists spend the summer measuring changes in the Arctic ice cap that has been gradually shrinking during the past few decades. It is, he says, the ultimate edge of the world, where the sun never sets in summer, the air temperature is 20 degrees below zero, and visitors camp on ice that is moving at the rate of 400 yards per hour. Hence the title The North Pole Was Here. There is no striped barber pole marking the North Pole. Wherever such a marker is set up, the drifting ice quickly carries it away from the true north point. Revkin meets Stanton, who has made three expeditions to the North Pole -- two by air and one on a Russian icebreaker -- setting up many of the instruments he invented, to measure climate change. Chapter Five of Revkin's book opens with a description of a Russian helicopter crewman dancing on top of blocks of ice formed where frozen plates of Arctic Ocean floes, up to 60 miles long, have collided. "The ice beneath the dancing man is chugging like an old steam locomotive building speed as it leaves a station. Every half minute or so, the little hill of ice slabs shifts slightly. "From about 20 yards away, I am watching this unnerving performance with Tim Stanton, a veteran Arctic oceanographer. For the complete article, go to Sunday, April 23, 2006, http://www.montereyherald.com/mld/montereyherald/14410518.htm.

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SSAG Update

Dr. Joseph Bonometti, an aerospace engineer at the NASA Marshall Space Flight Center, Huntsville, Alabama recently assumed the Michael J. Smith Space Systems Chair Professorship within the Space Systems Academic Group (SSAG) and will serve as a liaison between NASA and the NPS, bridging the military and civilian space communities. Dr. Bonometti is the technology area manager of Emerging Propulsion Technologies in Marshall's In-Space Propulsion Technology Office, and manages research and development of advanced propulsion technologies for future space exploration. Dr. Bonometti earned his Doctorate in Mechanical Engineering from the University of Alabama in Huntsville and is a 1982 graduate of West Point. He has experience in nuclear physics/engineering for space applications and has authored numerous aerospace technical publications. His recent work includes tether-based propulsion technology research, such as electrodynamic systems and their spin-off technologies.

Special Recognition

- Professor Young W. Kwon, (MAE), was elected as an Executive Committee Publication Chair of Pressure Vessel and Piping Division of ASME last year.

- Daphne Kapolka, (PH), recently finished the first edition of her Blackboard-based textbook *Underwater Acoustics for Naval Applications.* Drawing from her experience in the Navy as an ASW Officer and Assistant Program Manager in the Fixed Undersea Surveillance program, she produced a text focusing on issues concerning our student population.

Daphne Kapolka of the Physics Department recently finished her Blackboard-based textbook *Underwater Acoustics for Naval Applications.*